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RESEARCH ARTICLE

ASSESS THE EFFICIENCY OF MARJORAM ON WEIGHT CONTROL AND BODY COMPOSITION OF MALE AND FEMALE ADULT STUDENTS.

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Obesity, herbs, marjoram.

Abstract

Background: Obesity is a global epidemic and consequently many individuals are seeking strategies to reduce their body weight. These strategies may include weight-loss food supplements, including plant food supplements PFS, such as appetite suppressants or those increasing resting metabolism. PFS that claim to contribute to weight loss are marketed worldwide and readily available over the Internet. This increased usage has coincided with a resurgence of interest in nutritional therapy and complementary and alternative medicine. Marjoram is one of the most familiar kitchen herbs. Marjoram is gastrointestinal tract stimulant, tonic, carminative, hypoglycemic and diuretic as well as antibacterial and as antioxidant.

Objectives: The present work was designed to study the effects of marjoram on weight reduction in obese and overweight humans.

Methodology: The study was conducted on 64 healthy students, female students were from Faculty of Applied Medical Sciences, and male from College of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia.40 students consume marjoram one month. Anthropometric measurements were done before and after marjoram consumption. Statistical analysis was performed using SPSS software version 20.

Results: The obtained data showed most of student's preferred strategy of physical activity and diet to reduce their weight. A significant reduction on body weight after one month of consuming marjoram was observed.

Conclusion and Recommendation: The present study suggested that marjoram has effective herb on weight reduction.

Introduction:-

Obesity is a public health problem, which is increasing in KSA with an overall obesity prevalence of 35.5% [(1)]. It is strongly associated with diabetes, hypercholesterolemia, and hypertension in the KSA, although the epidemic's characteristics differ between men and women. Therefore, the reduction in overweight and obesity are of considerable importance to public health [(2)].

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Many people who are obese or overweight try to lose their weight by following different strategies, such as increasing physical activities, diets prescribed by health professionals or from official dietary recommendations , or by using medications if the lifestyle modification is not sufficient [3,4].

A cross-sectional study was done in Australia in normal, overweight, and obese subjects showed that participants tried losing their weight by using one or more of strategies, which include weight loss center programs, prescription medication, over the counter supplements, changed diet, increased exercise or consulted a specialist. This study showed that changing diet and increasing exercise are the most common strategies used by participants [5].

Another group of people tends to use herbs as a safest, costless, and effortless way to lose weight. Nowadays, herbal medical is a growing area of alternative medicines. Many active ingredients in manufactured drugs are derived from plant compounds and have a wide range of use. Plants and plant extracts considered as safer as and more popular than chemical products [6].

In recent years, many studies have focused on the bioavailability of phenolic compounds in the prevention and treatment of obesity. Phenolic compounds and flavonoids have pharmacological properties such as antioxidant, antimutagenic, antithrombotic, anti-inflammatory, anticancer and antihyperlipidemic. They are widely distributed in plants and form part of the human diet [7].

Marjoram (*Origanummajorana*) is one of the herbal plants that contains phenolic compounds. It is found all over Asia, Arabian Peninsula, Africa, America, and Europe [6].

Ethanolic extract of *Origanummajorana*has been shown to possess anti-inflammatory, antioxidative, hypolipidemic and hepatoprotective effects against LPS-induced endotoxemia. So it can be used as an effective and safe alternative complementary treatment [8].

In addition, medicinal effects of marjoram also include gastrointestinal tract stimulant, tonic, carminative, diaphoretic, hypoglycemic, diuretic as well as antibacterial [7].

One of the previous study was done on rats to see the effect of natural herbs of marjoram and ginger on weight gain and level of cholesterol, this study found that the hypercholesterolemic rats which fed on hypercholesterolemic diet with marjoram, ginger or mixture of them demonstrated lower values of body weight gain compared to control group which fed also on hyperchloletrolemic diet without taken marjoram or ginger [6].

Subjects And Methods:-

Subjects:-

Study was conducted on 64 healthy students (36 female – 28 male), female students was study on Faculty of Applied Medical Sciences, and male from College of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia. The students were Saudis and have been collected in variation of different stages and different medical specialties.

Methods:-

Study design:-

40 students were agreeing to consume marjoram tell one month all these who participated were met the following inclusion criteria:

1. Consent to participate in the study.
2. Healthy
3. Not use any medications or nutritional supplements.
4. Not pregnant or lactating women.
5. Not following any regimen for weight loss
6. Not allergic.
7. Not suffering from any chronic illness like Diabetes Mellitus, Chronic renal failure, asthma etc.

Data collection:-

The data were collected by direct interview. The questionnaire was completed by the researchers.

The study questionnaire: The questionnaire covering three sections as follows:

Demographics-Socio- Economic Data:-
Include data about the general characteristics of the study sample such as gender, age, and income.

Dietary and Health Assessment Questionnaire:-
Include dietary habit and intake, interest of weight management, and health status of the participants.

Anthropometric Measurements:-
Anthropometric measurements are reliable and valid measurements that indicate nutritional status of the subjects. Bioelectrical Impedance Analysis (BIA) device was used to measure weight, BMI, visceral fat, body fat percentage, body muscle percentage. Regarding to weight, participants were asked to remove their heavy outer garments and their shoes.

Height was measured by using a measuring tape, with the shoulders in relaxed position and arms hanging freely.

Body Mass Index (BMI):-
Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults (table A). It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m2) [(9)].

Table (A):-Categories of BMI (WHO, 2016) (9).

BMI Kg/m2	Classification
≤18.5	Underweight
18.5to24.9	Desirable weight
25to29.9	Overweight
≥30	Obese

Herbal Material:-
Organic marjoram herb (dried leaves) was purchased from local markets. It was placed in small storage bags, each containing 1.5 g of herb (equivalent to one heaped teaspoon). Preparation of marjoram tea was performed by participants. They were taught to prepare this in accordance with the traditional method, which steeping the bag of marjoram tea in 250 mL of boiled water until the color changed, followed by straining. Participants were instructed to drink one cup (250 mL) of the assigned tea, unsweetened, daily after their main meal by 2 hours.

Statistical Analysis:-
All results were tabled with SPSS software 21th edition. Descriptive statistics were run to summarize the collected data, and the results were displayed in frequencies and percentages. Chi square analysis was performed to test the differences between variables. Obtained results were tabulated and expressed as (mean ± SD). The differences among the participants were analyzed by T, test. All statistical analyses were performed at significant level of 95% (P. value ≤ 0.05).

Results:-
The demographic profile of participants presents in table (1) which shows that out of 36 subjects, 56.2 % were females and 43.8 % were males. Income vary between them, nearly half of them has >8000 SR/month .All of the participants were falling in the age group of 19- 25 years old.

Table 1:-Demographic, social, and economical characteristics of male and female participants including both intervention and control group.

Variable	Frequency	%
Age (year)	40	62.5
19-22	24	37.5
22-25	64	100.0
Total		
Gender		
Female	36	56.2
Male	28	43.8
Total	64	100.0
Income level		
≤ 3000	18	28.1
~5000	6	9.4
~8000	10	15.6
>8000	30	46.9
Total	64	100.0

As showed In table (2) the number of females have regular weight monitoring and looking for ideal weight is more than males which represents (83.3% Vs.72.4%) respectively. Most of females showed that they measure their weight once in a month or less (44.4%), while most males showed to measure it twice a month (35.7%). Females have interest to loss their weight to improve confidence and appearance and health status with a significant difference with males (P<0.05). Most participants prefer using diet on weight reduction than other methods.

Table 2:-Weight control and monitoring awareness among males and females participants.

Variables	Male		Female		P.V
	No.	%	No.	%	
Regular weight monitoring					0.373
Yes	16	57.1	26	72.2	
No	12	42.9	10	27.8	
Total	28	100.0	36	100.0	
Looking for ideal weight					0.419
Yes	20	71.4	30	83.3	
No	8	28.6	6	16.7	
Total	28	100.0	36	100.0	
How many times you measure your weight?					0.429
≤ 1 per month					
2 per month	6	21.4	16	44.4	
1-2 per week	10	35.7	10	27.8	
Every day	6	21.4	6	16.7	
Don't remember	0	0	2	5.6	
	6	21.4	2	5.6	
Total	28	100.0	36	100.0	
First reason to lose weight		35.7		38.9	0.048
Health	10	35.7	9	55.6	
Improve confidence and appearance	10	0	25	5.6	
Society influences	0	28.6	2	0	
Other	8		0		
Total	28	100.0	36	100.0	
Common way to lose weight		7.1		16.7	0.747
Herbs	2	0	8	5.6	
Medications	0	57.1	2	38.9	
Diet	16	21.4	14	22.2	
Physical activity	6	14.3	6	16.7	

Nothing	4		6		
Total	28	100.0	36	100.0	

As showed in the table (3) the appetite of males was significantly (P<0.05) better than females (50%) of males have excellent appetite, while most of females (44.4%) have good appetite. Both of males and females consider lunch as the main meal and preferred home foods as their favorite food.

Table 3:-Distribution of the participants regarding to dietary habits and intake.

	Male		Female		P.V
	No.	**%**	**No.**	**%**	
Appetite					0.042
Weak	0	0.0	8	22.2	
Good	6	21.4	16	44.4	
Excellent	14	50.0	10	27.8	
Over	8	28.6	2	5.6	
Total	28	100.0	36	100.0	
Main meal					0.154
Breakfast	0	0.0	8	22.2	
Lunch	20	71.4	14	38.9	
Dinner	6	21.4	8	22.2	
None, But frequent snacks	2	7.1	6	16.7	
Total	28	100.0	36	100.0	
Favorite Food					0.118
Fast food	14	50.0	8	22.2	
Fruits & Vegetables	0	0	6	16.7	
Home meals	14	50.0	22	61.1	
Total	28	100.0	36	100.0	

In table (4) data shows that 28.6% of males have heard about marjoram herb, while 44.4% of female heard about it, 71.4% of males and 55.6% of females did not have knowledge and background about marjoram herb. 7.1 % of males known about health benefits of marjoram herb while the same percentage (7.1%) of them answered that marjoram herb doesn't has health benefits, and the majority of males (85.7%) don't know whether the herb has health benefits or not. The same trends were found on females.

Table 4:-Knowledge and attitude towards marjoram herb.

Questions	**Male**		**Female**		**P.V**
	No.	**%**	**No.**	**%**	
Have you ever heard about marjoram herb?		28.6		44.4	0.358
Yes		71.4		55.6	
No	8		16		
	20		20		
Total	28	100.0	36	100.0	
Does it have a health benefits?		7.1		16.7	0.394
Yes	2	7.1	6	0	
No	2	85.7	0	83.3	
Don't know	24		30		
Total	28	100.0	36	100.0	

In Table (5) data and results shows Post-consumption feedback by asking six questions, then make a comparisons between males and females. 33.3% of males noticed effect of marjoram herb, compared to 66.7% did not. On the other hand, 37.5% of females noticed effect of marjoram herb, while 62.5% did not. Half of males said that they have experienced a side effect while the other half did not. 9.4% of females experienced a side effect while the majority (90.6%) did not with a significant difference (P<0.05). 16.7% of males have nausea and abdominal pain accompanied with using herb while there's no reported case of associated diarrhea. In females, results show that 93.8% have no side effect, 10% have nausea and no reported case of them associated with diarrhea or abdominal pain. Data show a significant difference (P<0.05) between meals and females who decide to use marjoram, 71.9% of females would like to continue drink it compared to 66.7% of males decided to not continue drink marjoram tea. Regarding to the role of

marjoram in suppress appetite, 33.3 % of males and 31.3% of females answered (yes), while 66.7% of males and 68.7% of females answered (no). Most of them noticed suppression effect of marjoram toward fat foods with insignificant difference between them.

Table 5:-Demonstration of the Post-consumption feedback.

Questions	Male		Female		P.V
	No.	%	No.	%	
Did you note any effect?	8	33.3	14	37.5	0.790
Yes	16	66.7	18	62.5	
No					
Total	24	100.0	32	100.0	
Side effect?	12	50.0	3	9.4	0.044
Yes	12	50.0	29	90.6	
No					
Total	24	100.0	32	100.0	
There is any problem accompanied with herb….	14	58.3	30	93.8	0.039
No	4	16.7	2	6.2	
Nausea	0	0	0	0	
Diarrhea	4	16.7	0	0	
Abdominal pain	2	8.3	0	0	
Other					
Total	24	100.0	32	100.0	
Would you like to continue drink it?	8	33.3	23	71.9	0.043
Yes	16	66.7	9	28.1	
No					
Total	24	100.0	32	100.0	
Is there any suppression effect on your appetite?	8	33.3	10	31.3	0.551
Yes	16	66.7	22	68.7	
No					
Total	24	100.0	32	100.0	
If yes, towards which food?	4	50	8	80.0	0.411
Fats	2	25	2	20.0	
All	2	25	0	0	
Fast food					
Total	8	100.0	10	100.0	

Data presented in table (6) shows that the mean value of weight was significantly (P <0.005) decreased after one month of consuming marjoram than before represented (78.88±5.06 vs. 77.95±5.01) respectively. Percent of fat and Visceral fat was decreased but with insignificant different.

Table 6:-Anthropometric measurements of participants before and after one month of marjoram consumption

Variable	Before	After	P.V
weight	78.88±5.06	77.95±5.01	0.006
BMI	27.10±1.39	26.74±1.44	0.086
Fat %	33.66±1.41	33.34±1.72	0.727
Muscle %	27.71±1.02	27.65±0.84	0.942
Visceral fat	8.62±1.11	8.16±1.07	0.314

Discussion:-

Obesity becomes more prevalent, weight-loss practices grow increasingly popular in developed and developing countries. More than two-thirds of the adult population of the United States has attempted to lose or maintain weight [(10)], and between 15 and 35% of adults in Canada, Netherlands and the European Union are trying to lose weight at any given time [(11)]. The proportion of adolescents and university students attempting to lose weight is even greater: 30% in Lebanon [(12)], 23% in Canada [(13)], 37% in Japan [(14)].

Obtained data in the present study showed that 57.1%, 72.2% of male and female respectively interest to monitor their weight and 71.4% of male and 83.3% of female take care of IBW, to feel satisfied with their body shape

appearance and to prevent diseases related to obesity. These finding agree with **Lynch *et al*., (2007)** [(15)] they reported that, thin body is the most preferred body shape in Western countries. Data showed that the first priority of females to loss their weight is to improve confidence and appearance. In agreement with this result Najat***et al*., 2011**[(16)] they found that females were more worried about their body shape than males as 89% of the worried students were females, whereas, the majority of the "not worried" group were male students.

Most of students preferred diet and physical activity to reduce their weight, in the study of dieting practices, weight perceptions, and body composition: a comparison of normal weight, overweight, and obese college females, **Malinauskas*et al*., 2006**[(17)] found that 80% of their participated students used physical activity as a weight control strategy. Another study done by **King *et al*., 2007**[(18)] among 204 students, recruited from Midwestern University, reported that students did exercise to lose weight and improve their body appearances.

Less of participants use herbs for weight control (7.1% of male and 16.7% of female). In disagreement with this results **Mamtani*et al*., (2005)**[(19)] they found that most participants favored herbal supplements for reducing weight and they reported that all health-care practitioners and students should be educated about benefits and risks of herbal supplements. In the study of Herbal Medicine among Saudis: Awareness, Uses, Reasons and Common Herbs, **Abdulaziz Alanzi*et al*., 2016**[(20)] found that (80%) out of their sample have used herbs as a medications and herbs used for acute conditions account for (70%) while chronic conditions only (20%).

Data presented in table (6) showed significant reduction on body weight after one month of marjoram consumption. In agreement with this result **Lobna*et al*., 2014**[(21)] they found that food weight gain, food intake and food efficiency ratio showed significant decreases in experimental group of rats consumed marjoram compared to normal control group. **Soltan and Abdel Wahab, 2006**[(22)]reported that the hypolipidaemic activity of marjoraml in rats could be attributed to the presence of valuable polyphenolic compounds, terpenoids, flavonoids, tannins, hydroquinone, phenolic glycosides and sabinene. **Amarowicz*et al*., 2008**[(23)] found that marjoram ethanolic extract contain considerable amounts of total phenolics compounds and have antioxidant activity and free radical-scavenging capacity. **Rang andDale, 1991**[(24)] reported that the hypocholesterolemic effect of marjoram could be attributed to presence of isoflavones which prevent intestinal absorption of cholesterol by competition for its absorption sites. These results are also in accordance with **Negm, 2002**[(25)] who found that marjoram extract lead to significantly lowering in TG ($p<0.01$) than may be due to lower fatty acids synthase. In the study of Biochemical and histopathological studies on the water extracts of marjoram and chicory herbs and their mixture in obese rats **Lamiaa*et al*., (2009)**[(26)] found a significant weight reduction in rats group take 5% marjoram than negative control group.

Conclusion:-

The present study suggested that marjoram has a good effect on weight control and percent of body fats.

Recommendations:-

- More scientific studies on the effects of marjoram on weight reduction on the human are needed.
- Make other study emphasis on side effect of mega dose of marjoram.

Limitations:-

The limitation in this study may be related to the small sample size and limited time.

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